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NOTES ON SHIPBUILDING AND NAUTICAL TERMS OF OLD IN THE NORTH

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NOTES ON SHIPBUILDING AND NAUTICAL TERMS OF OLD IN THE NORTH.

SHIPBUILDING is a term which, historically translated, means: the solution of the problem, how to turn the surface of water into a thoroughfare for man. In order to obtain as clear a view as the hazy outlook permits, of some, at least, of the experiences which brought man, through a very long and painful process, to the solution of this problem, we must go all the way back to the remote period of the stone age.

The child of nature, that we are self-conceitedly in the habit of calling the savage of the stone age, was, for all his savagery, especially considering his extremely limited opportunities, hardly a less deft scholar at the school of Necessity, the Mother of Invention, than at any time has been his descendant, the man of the bronze, iron, steel, and steam ages. At any rate, to the stone-age man is honour due for having made the discovery which I, at least, have no hesitation in describing as the everlasting mother of all inventions that have borne, or ever are likely to bear, on the practical purposes of human life. Like so many other discoveries, this one also arose out of antecedent causes, which originated in the conflict of man with the conditions of his environment. His life was one of ceaseless battle for existence. By a sad necessity, a pitiless law of life, he was obliged to maintain his own existence by the destruction of the existence of other living things. His self-chosen enemies were the poor

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animals whose fatality it was to rejoice in life within his environment. Some were too strong for him to fight at close quarters, others too swift for him to get to close quarters with. In both cases he had to improve upon his disabilities by the artificial means to which he gave a name that, probably, had a meaning similar to that originally implied in the word weapon, which possibly may be radically related to the Sanskrit root *vap*, to strew, to sow. If the stone-age man was able to form a collective term for the means of attack at his disposal, some term indicative of throwing was the most natural to employ, for most of his weapons, the bow, the sling, even the club, etc., were calculated for the action of throwing. Among the objects most eminently suitable for this purpose that his environment supplied him with none, probably, was more common or more readily at hand than the stone.

Of all the kinds of stone that man made use of for weapon, evidently the flint was the one to which he gave his most intelligent attention. This is amply proved by the fact that the flint industry, that is to say, the manufacture of a great variety of objects of flint usefully answering a corresponding variety of practical purposes, was really the one universal industry of the stone age.[1] All the stones that man made use of fell into two groups: the brakeable and the flakeable, the latter peculiarity being the exclusive property of the flint. He had been making use of the flint as weapon for no great length of time when he observed, not only that it did flake, but also that its flakeability had something interestingly curious about it. By knocking two nodules of flint together in a particular manner, he observed that one or both would flake in converging planes. Two such planes would sometimes meet in so acute an angle as to leave the line where they met as sharp as that of a razor's edge. No doubt our rash, unwary savage cut himself in the course of his first inexperienced handling of his new curiosity. The first cut was pregnant with progressive evolution.

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[1] I may mention that in Norwegian dialects the root *flin-* in "flin-t," the raw material, seems to assume the syncopated form *flī*, whenever the manufacture of the raw material is in question. We have thus: "Flī," f., a thin chip, a plate; "flī," n., implements, tools; "flĭ," wv., to manipulate, to make by hand, put to rights, put in order, ornament, adorn. I mention this, because, in my opinion, we have the same stem to deal with in the common modern Scandinavian term "flī-d," "fli-t" = industry, originally flint-industry, M.H.G. "vlî-z," O.H.G. "flî-z," mod. H.G. "fleiss."

The savage had, ages before this, ascertained the fact that the material objects he was thrown into contact with and was in the habit of handling, fell into two classes: the hard and the not hard. He was intelligent enough to conclude that his flesh was cut by the flint, not only because to his startled mind it was miraculously endowed with sharpness, and pre-eminently suitable for wounding and killing, but especially because the material it was made of was evidently much harder than the substance of which his own flesh was tissued together. This set him thinking, and he was led to the further conclusion that, as the sharp flint had cut his flesh, so, probably, it would cut to pieces any material composed of a substance softer than that of which itself consisted, and thus might be turned to other uses than the invaluable one of shedding life-blood and causing death.

He put his theory to practical test; he tried his flint on a piece of bone, horn, or green wood, and found that what he had imagined came true. As he went on experimenting with the new wonder he realized with delight that in his manipulating hand it lent itself to fashioning certain forms and figures, which from life and nature were reflected in the mirror of his imitative mind. I am not romancing, I am stating a plain fact, when I say that now the primitive savage had come upon the most epoch-making technical discovery that man ever made. He had discovered the EDGE; that no less astoundingly simple than almost magically effective agent for good and evil in the practical affairs of life. For on the edge, ever since its discovery, has depended, and probably will depend to the end of time, the whole artistic and artificial environment of human existence, in all its infinitely varied complexity. Look wherever we may upon the artificial surroundings of our life, their direct or indirect descent from the edge is a fact that stares any observant beholder in the face. By this discovery was broken down a wall that for untold ages had dammed up a stagnant, unprogressive past, and through the breach were let loose all the potentialities of the future civilization of mankind. It was entirely owing to the discovery of the edge that man was enabled in the course of time to invent the art of shipbuilding.

Directly, however, the discovery of the edge was not inductive to the invention of this great art. The experiences that, step by step, led primitive man to the conception of that invention proceeded from causes probably in the main independent of the agency of the edge, but intimately and vitally associated with the alimentary conditions of his environment—with his struggle for existence. By briefly surveying this environment we shall be able the more clearly to realize the under-current causation which ultimately brought reasoning man to the solution of the problem before him.

The stone-age man, generally speaking, was confined to a narrow strip of land, bounded in front of him by waters—rivers, lakes, straits, or open ocean—and in his rear by primeval woods standing deep in matted impenetrable jungle. He was ignorant of the kindly bounteousness of cultivated earth. He knew nothing of the sources of sweet nurture and comfort supplied by domestic animals; of these latter he knew only the dog, an invaluable ally on account of its capacity for hunting. In these circumstances he had to devote his whole energy to the pursuits of hunting, to fishing from bank and shore, and to the catch of what marine mollusks and crustacea the ebb-tide left within his reach in shallow foreshore waters. In proportion as man multiplied the supplies of his very limited dominion were bound to diminish. With his weapons, the club, the spear, and above all the stone, and the hunting dogs, he destroyed the land animals, or frightened them away; fishing and the catch of crustacea were mostly confined to the warm season; clearing the ebb-shallows of mollusks was, in each case, only a matter of time. When one haunt was exhausted of supplies to such an extent that the community was reduced to short commons, the only chance of avoiding the impending famine was for the tribe to break up and thread its way along the water until a virgin tract was reached, where a halt was made, and a new temporary abode selected, or, which comes to the same thing, a certain spot was fixed upon where, it was agreed, the community should consume in common the proceeds of the hunter's and the fisherman's daily toil. This was a matter of necessity in a communistic society. The provider of food must know for certain where to take the proceeds of each day's labour; the whole community must be witness to the equal distribution of those proceeds among all its members. This process of intermittent migration is very clearly illustrated by the "køkkenmøddinge"—huge offal-heaps—in Denmark, which contain the remnants of the meals of the early stone-age folk, and are found at considerable, but varying, distances along the sea-shore. Here are found heaped together prodigious quantities of shells, bones of fish, and of a large variety of wild mammals, such as bear, wild boar, red-deer, roe, beaver, seal, urochs, fox, wolf, lynx, marten, etc., besides charcoal remains and rudely flaked objects of flint. In these heaps are stored, if I may be allowed the expression, the archives of the earliest history of man in the North.

Now we have seen enough of the environment of primitive man to come to the conclusion that existence within it must have been one of a very precarious character. Seasons then, as now, were good, bad, or indifferent. But a bad season then was an infinitely more serious matter than a bad season is now; and the stone-age man must, at times, have experienced famines so appalling that we can form no adequate idea of their destructiveness. We can easily imagine how, in hard and hungry seasons, he must have taken desperately to heart the limitations of his capacities. The uninhabited river-bank, or island shore, opposite the one he himself was occupying, with the sources of livelihood running dry, he knew would in all probability supply him with means for saving the lives of his starving relatives and dependents. In spite of all the incentives wherewith self-preservation, cupidity, and the delights of the chase stimulated his mind, he was in most cases effectively debarred from the objects of his yearning by intervening waters. Here he stood helpless, face to face with a problem, probably the most hopeless of solution of all that presented themselves to primitive man. By what means could man turn the surface of the waters into a thoroughfare?

The myriads of water-fowl the savage saw swimming over the waters in front of him had solved the problem to perfection, and could go in quest of their food wheresoever it suited them, while he, helpless and hunger-stricken, could only stand by the water's edge and gaze. No matter to what pitch of perfection he carried his expertness in swimming, he could only swim in, not on, the water; across it he could carry or convey nothing of any bulk, least of all anything with a tendency to sink; besides, he was prevented from deriving full advantage of his mastery in swimming by changing temperatures, insidious under-currents, rapids, water-enemies, etc. The solution of this tremendous problem must have exercised the searching mind of man for a very long time. Ultimately his intelligent observation of certain manifestations within his own environment opened to him the path by which he was enabled to surmount the stupendous difficulty he was coping with.

To the sea-shore he roamed along, winds and ocean currents would carry logs of wood, trunks of trees; the river, along the bank of which he fished, bore down, when in flood, similar materials from unknown hinterlands.

The children of nature are sportive and venturesome above all things. Merely for the fun of the thing the stone-age man must have mounted many a log that he found drifted into shallow water. He could not fail to observe that the larger it was the less tendency it had to sink under the weight of his body. It stands to reason that this kind of acquaintance with the floating properties of tree-trunks led to tying two or more together. On the top of them, so joined together, man could take up a position dry-shod and dry-skinned. The dream of long ages was realized; the formidable problem was solved, provisionally at all events—the first RAFT carried man on the water. The invention was rude and very imperfect, because it was, except in the most favourable circumstances, beyond the control of man, being otherwise wholly subject to that of wind and current. Yet by a punting pole and roughly-fashioned paddle he could—weather and current permitting—take the raft out to sea for fishing purposes further than he could get by any other means. On lakes and languid streams it could, probably, be paddled to advantage, thus facilitating, in a manner heretofore unknown, the migratory efforts of primitive man.

Through a long course of observation it became evident to the primitive natural philosopher that a trunk that had lost some of its inside substance floated more lightly on the water than one wholly solid. With the experience thus gained of floating logs, it was but natural that this ardent observer should reason to himself somehow to this effect: Since hollow trunks float more lightly on the water than solid ones, they must do it because they have lost the inside substance, while the others retain theirs; if, then, I can manage to hollow one by removing from it the greater part of its inside wood, will it float with me if I put myself in the hollow of it? He set about the experiment. He now had the edge to fall back upon; he wielded his flint-axe and other edged flint implements. The texture of the wood was very destructive of the sharpness of the edge, and wasteful of the implements. But he called to his aid an effective agent to lighten and quicken his work. He set fire to the inside of the trunk, and kept it burning under proper control until the tree was hollowed to his satisfaction. The charred masses he scooped out with his flint-axe. Both ends were rounded off on the pattern of the breast of the bird that swims. The builder now launched his craft, stepped inside it, and it floated, with the joyfully surprised maker on board. The dark problem of ages was solved; the surface of the water was turned into a thoroughfare for man. An era of vastly increased happiness was inaugurated. The unknown day when this craft was launched for the first time was the birthday of the great art of SHIPBUILDING.

From the raft our ship-builder took with him the paddle, and adjusted it to the proportions and properties of the new craft, which yielded to this means of propulsion as ready an obedience as the raft had yielded a cumbrously reluctant one, or none at all. The first product, then, of the new invention was a monoxylous craft. I have presumed all along that the invention dates from the stone age. It is a fact, however, that with none of the monoxyla which Scandinavian bogs and lakes have given up have there been found objects hailing from the manufactories of the stone age. This evidence, besides being negative, loses a good deal of the importance one might be inclined to attach to it, when we consider that, firstly, the stone-age populations crossed water too broad to make it at all likely that the transit took place by means of rafts; secondly, that the charred insides of some monoxyla bear witness to their having been hollowed out by means of fire, a device for which there could have been no need in a metallic age; thirdly, that the "køkkenmøddinge" contain remains of fish which only live in deep water, consequently further out at sea than rafts can be supposed to have been taken; fourthly, that canoes of this description have been found in the lake dwellings at Robenhausen in Switzerland which, undoubtedly, are of the stone age; and, fifthly, that in Scotland one monoxylon with a stone-wedge within it has been found. On this evidence, partly inferential, partly positive, it seems quite safe to conclude that the stone-age man was actually the first boat-builder.

This monoxylous family of craft must have been in general vogue for a very long time, and in certain localities people must have taken a very rigid conservative fancy to it. This is to be inferred from the fact that, even up to the present, stray specimens of it are found still alive. On the inland waters of Wärend, in Sörmanland, in Sweden, and on the Orkdale river in the countryside of Rennebo, in Norway, these cranky craft still do ferry service, as they did thousands of years ago. They are called: in Norway "ege," in Sweden "eka" and "ekestock," both forms being derived from the old Scandinavian "eikja," oakie, a feminine derivative of "eik," oak. The name points clearly to the fact that, originally, monoxylous canoes were made out of oak-trunks, the obvious reason being that the oak-trunk was the thickest to be found in the wood, and, consequently, when hollowed out, made the most capacious hull. On the evidence of this name I think we are warranted in concluding that it was in an oak-growing country that shipbuilding originated. That the name "oakie" should stick to the craft even when it was made of other kinds of wood was but natural. In the North, Denmark, which was densely wooded in the stone period, was probably the country where "oakies" were first made.[1]

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[1] The existence of the "eikja" goes back even to mythic times, as we learn from "Hárbarðsljóð," v. 7, where, in charge of Odin, it figures as a ferry-boat belonging to Hildolf of Ráðseyjarsund. In Norwegian Laws it only does ferry service; cf. Frostaþings lög xiii. 10. Sigvat's much-abused "eikju-karfi," Heimskringla, Olafs saga helga, ch. 91 (F. Jónsson's ed.), was also a river-boat, and evidently the same as, or at least very similar to, the "eikja." Sigvat's experience of it dates from 1018. In 1177 King Sverrir ferried his men across the river Orka in Rennabú by means of "eikjur." Monoxyla, not only in the North, but wherever we find them mentioned elsewhere (see below), are in most cases river-ferries.

In connection with this family of craft I must call attention to an exceedingly old name for ship which is found, and that rarely, only in poetry and in one compound proper name from mythic times. This name is "nór." About its meaning there can be no doubt. Thiodolf from Hvin, a Norwegian poet of the ninth century, uses the word in his Ynglingatal to effect a *kenning*, or poetical periphrase, for a house, which he calls "brand-nór," or "hearth-fire's ship."[1] In the poetical glossary of the younger Edda it is also entered among the appellatives for ship.[2] But it is in its mythic setting that it demands particular attention.

In the morning of time there befell a feud between Odin's divine tribe, the Æsir, and the people whom our mythographers call Vanir, and frequently designate as the *wise* Vanir. The feud came ultimately to an end, and both sides exchanged hostages to ensure a lasting peace. The Vanir gave to the Æsir him who was called Niord (Njörðr); he was admitted to divine honours by the Æsir, with whom he remained for good. He was worshipped as the Lord ruling the course of the winds, having in his power to still the sea and to control fire. It was profitable to make vows to him for sea-faring and fishing; and he was so wealthy and so gainsome of riches that he would bestow lands or loose wealth on those who approached him with vows to that end. He abode at the place called Nóa-Tún, the town of ships.[3]

It seems clear that the "nóar," from which Niord's residence derived its name, were the ships he brought with him from his people, who were a sea-faring and trading community, but whose locality is as yet uncertain. In the dialect, then, of the Vanir, the name for a ship was "nór." Now, it is obvious that this form is closely related to Greek "*ναῦς*," Latin "navis." But a still closer affinity presents itself in the Irish "noe," "noi," one of the oldest words for ship in the Irish language, as an Irish scholar at Cambridge informs me. The word occurs several times in the oldest tractates of the ancient Laws of Ireland, the Senchus Mór, and the Lebar Aicle. What sort of a craft it was does not appear with full certainty; it might be monoxylous, or of the currach or coracle type. Now, considering the great age which, no doubt rightly, is claimed by Irish scholars for the Brehon Laws, I think we must take it, if not for granted, at least as very probable, that this nór of the Vanir-dialect is a Celtic loanword of a very high antiquity. If such should be the case, it follows that the Vanir must have been closer neighbours of the *continental* (or the Irish?) Celts than the Odinic community; if, indeed, they were not a Celtic tribe. Properly speaking, in the North this word is an exclusively Norwegian term, which migrated, of course, from Norway to Iceland with other ancestral traditions. No trace of the word is found in Denmark or Sweden. I am inclined to think that Niord's "nóar" were monoxylous craft. This I infer from the fact that in the Norwegian "landsmål," rural speech, the word "no" or "nu" signifies a mug, or small vessel made out of a solid piece of wood, and that in Iceland "nói" in the peasant speech, means a wooden vessel in which liquid food is doled out to children.

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[1] It is a kenning of the same type as "arin-kjóll," navis foci, "knörr legvers," navis lecti, "nökkvi toptar," navis parietum, etc.

[2] Snorri's Edda I. 581^{11}.

[3] Völuspá 23, 24, Skirnismál 17, 18; Snorri's Edda I. $92^{10\text{-}16}$.

The son of Niord was Frey, the dispenser of rain and sunshine, and therewithal of the fertility of the earth, "and it is well to make vows to him for plenteous seasons and peace; he also rules man's luck in gaining wealth." [1] Frey, too, is lord of a famous ship called "Skíðblaðnir." The name is composed of *skíð*, possibly the stem of "skíðe" (German *scheide*, English *sheath*, a case, covering, *fourreau*), and "blaðnir" from "blað," blade—but in the sense of thin leaf, folium, lamina, anything that is distinguished by great thinness, and some width,—and *nir*, a suffix indicative of the thing signified by the term it is attached to being prominently present, so that "blaðnir" should mean: "that is of (many) leaves." Thus "Skíðblaðnir" should mean the boat sheathed or covered with many patches. The mythographers describe the craft as the bravest of all ships. It was so big that all the gods could be accommodated on board it with all their warlike equipment; when the sail was hoisted a fair wind sprang up, bearing it wheresoever it was required to go. But the most striking peculiarity about it was that it could be folded up like a piece of cloth and put into a knapsack.[1] Here, of course, we see mythic folklore once more at work on its labour of love: the illogical hyperbole. The size is an absurd sort of exaggeration. That ships in the North were provided with mast and sail in the early mythic times of Frey we may fairly doubt, and mast and sail could not very reasonably be supposed to go into a knapsack. A wind blowing up when up goes the sail on board is a well-known legend of nautical witchcraft possessed by the Finns of northern Halogaland in Norway. But the statement that the boat could be folded up seems to be the one point in the myth which can stand examination. It seems to class "Skíðblaðnir" with craft of the coracle type, and the name itself seems even to point in the same direction. We have then, it would seem, in Frey's "Skiðblaðnir" a sea-going craft, while in his father's boats we, apparently, had only the river ferry-type.

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[1] Snorri's Edda, I. 96^{1-6}.

References to monoxylous craft used outside the North for the navigation of rivers and for crossing inlets of the sea, or for coastal navigation, are very numerous. Already as early as 401 B.C. Xenophon made acquaintance with the Mossynoikoi on the Black Sea, who, apparently, knew only the use of "one-beam" canoes ("an-byme scip," as the Anglo-Saxons translated monoxylon). These Mossynoikoi lived in wooden towers, *μόσσυν*, apparently a sort of habitation similar to the pile-dwellings of the lakes on the Continent in the stone age, and to those of the Veneti as described by Cæsar, as well as to the crannoge, lake and foreshore dwellings, in ancient Ireland. The canoes of the Mossynoikoi carried only three men on board.[1] Polybius refers to monoxyla on the Rhone when Hannibal crossed that river B.C. 218.[2] Arrian mentions them in use in great number on the Ister about 336 B.C.[3] The author of the Periplus of the Erythrean, or Red Sea, in the second century of our era, refers to monoxyla as employed in fishing and transport service along the coasts of those waters.[4] Isidore, reviewing the evolution of shipbuilding, says: "Rafts were the first and the most ancient kind of craft joined together of rough logs and timber. After its fashion were made the ships which were called log-ships, *naves ratariæ.*" He also mentions the "naves litorariæ," bank-boats, and "naves caudicæ," stock-boats, being hollowed out of one single "caudex," and capable of carrying from four to ten persons.[5] A large number of Byzantine writers, from the fifth down to the twelfth century, refer to monoxylous water conveyances, and particularly in connection with the many rivers traversing the continental dominions of the Eastern Emperors and their Northern neighbours.

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[1] Snorri's Edda I. 138^{21}—140^{1}.

Thus far the one-beam craft has chiefly been the object of our attention. But another family or type of floating craft in the North comes into existence, if not as early as the one-beam boat, at any rate at a very early period. This is the kind of craft which in the literature goes under the name of "húð-keipr," or hide-boat, a name which the Icelanders, on coming into contact with the Esquimaux of Greenland and North America, gave to their kaiaks, made of some sort of inner framework with skins, sewed together, stretched over them for a covering. We come across the object and the name in only three late Sagas, that of Eric the Red (ch. 3), of Thorfinn Karlsefni (ch. 9, 10), and of the Flóamenn (ch. 23). The only instance of boat-building of this description by Scandinavians is that recorded by the last mentioned saga of Thorgils, the stepson of Thorgrim Scarry-Bone, who, having lost his own boat in Greenland, made a "húðkeipr" in order to maintain himself and his company alive by fishing. But this is an isolated case in exceptional circumstances, and represents only Esquimaux tradition. In Scandinavia this sort of boat-building, to judge from the literature on record, is utterly unknown in historical times. True, there is a case mentioned, which shows that on the Scandinavian continent boat-making of this kind must have been known; that case, however, is not Scandinavian, but Lap. Snorri says that when Sigurd Wretched Deacon spent in northern Halogaland the winter of 1138-39, he had two cutters built for himself by Laps, "and they were sinew-bound and no nails therein, withes serving for knees; twelve men rowed aside on each of them. These cutters were so swift that no ship might overtake them."[1] Evidently we have here a survival of an ancient tradition, which among the non-Finnish Scandinavians had passed into total oblivion in historical times; for speech survivals exist which suffice to prove that once upon a time it was a general fashion of shipbuilding in Scandinavia first to put together the wooden or wattled framework of the boat, and then to cover it with skins sewed together. Moreover, this method of boat-making must have been in vogue at least before the culture of a metallic age had taught man the full use of THE NAIL. This I shall now endeavour to make plain.

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[1] *ἧκον τῇ ὑστεραὶᾳ ἄγοντες τριακόσια πλοῖα μονόξυλα καὶ ἐν ἑκάστῳ τρεῖς ἄνδρας.* Anab. V. 4, 11.

[2] Polyb. Hist. ed. Hultsch III. 42, 2; 43, 3.

[3] Arr. I. 3.

[4] Plin. VI. 26. Periplus, ed. Fabricius, § 15, 60.

[5] Isid. Etymologiae, lib. xix. 1.

In the rich vocabulary relating to Northern ship-building we meet with two standing technical terms of especial interest, which at first sight seem as strange as, on closer examination, they become not only natural, but clearly and convincingly illustrative of a method of ship-building which must have been universal before the era of nail manufacture began in the North. These terms are "súð" and "saumr."

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[1] Heimskringla (ed. F. Jónsson) III., 358^{18}—359^{2}.

"Súð" signifies the line that is formed by the overlapping of any two planks, or boards, nailed or riveted together through the laps, no matter what purpose such planks or boards may serve. But specially is it applied to what in boat-building is known as the clincher-build, the clench, or strake-lap. In seamen's language "súð" becomes a collective term, meaning all the clincher-joined strakes of a boat, or what English boat-builders call the "skin," or "case" of it. Lastly, "súð" is used, in a restricted sense, to signify ship, but mostly as first or second element in compound proper names, as "Súða-vík," Ships'-wick, "Bækisúð" Beech-hull, name of a special ship. So much for the application of the term. But what is the original sense of it? Etymologically "súð" covers the Latin *sut-* in "sutura" from "suo," "suere" to sew, exactly as "húð" covers *cut-* in "cutis," skin, hide; obviously its original meaning is "suture," a sewed together jointure.

The correctness of this interpretation is clearly borne out by the boat-building term "saum-för" (now "saum-far"), seam-fare, seam-line, which takes off exactly the special sense of "suð," strake-lap, adduced above. "Saum-för" is clearly a gloss on "súð," made when its primitive meaning, suture, was becoming obsolete and obscure to the living generation.

"Saumr" is the standing collective term for all the varieties of nails which are required for the building of a ship. Etymologically it corresponds exactly to the English word *seam*, and, in its general acceptation, means exactly the same: a sewed jointure. But in the technical application here in question it means *sewing material*. It is an interesting fact that, in the commercial language of the Scandinavians, including that of the Icelanders, all nails of any size, at least up to six inches long, go to this day under the collective denomination of "saumr" (Norwegian saum, Danish, Swedish, söm).

The facts I have now drawn attention to obviously warrant the deduction that there was a time when boats in the North generally had round their frame a covering, consisting of a material that could be sewed together; that material could only be *skin*. Only on this supposition is it possible to account for the use of the technical ship-building terms we are here dealing with. Now we have the testimony of Roman writers to the effect that in the first century of our era the Britanni, Celts of Britain, did their sea-faring in wicker-vessels, which they did round with a covering of ox-hides.[1] The words "súð" and "saumr" prove clearly, though indirectly, that the same description of Scandinavian ship-building, at a certain early period, would have been a correct one. I think we are warranted in assigning that period to some time on the other side of the nearer limit of the stone age. With the metallic age, and not before, the manufacture of nails came in, and the nail evidently effected a revolution in the method of ship-building, in that the sewed-together ox-hide covering of the frame of ships gave place to nail-joined, board-strake covering of the same, and wind-dried sinews of large animals, the old sewing material, to rivets and driven nails. Now, whatever name the manufacturers gave to their nails and nail-produce, the ship-building industry, realizing that the nail answered in an eminently suitable manner the purpose of the old material in joining, or sewing together, watertightly the overlapping edges of the wooden board-covering of a boat's frame, gave to the new rivetting material the name of the old sewing one. The transference of the name of the old to the new binding material was, really, a most natural one: what were nails after all but disjointed stitches, effecting the same thing as connected thread-stitches, namely the tight jointure of things otherwise disjointed.

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[1] Vitilibus navigiis corio circumsutis navigare. Pliny, Hist. Nat., IV. 30. Etiam nunc Britannico oceano vitiles corio circumsutæ fiunt. VII. 57.

The hide-bound family of craft goes, therefore, I think we may safely assume, back to the stone age. If "Skíðblaðnir" could be classed with this family, it would be the earliest specimen of it mentioned in Northern literature. But on that point nothing can be positively asserted. No ancient specimens of this craft have been found, or are likely to be discovered, on account of the perishable material the covering was made of, and the slender scantling of the framework. But I think I can make it probable that the principle on which the building of this skin-covered craft proceeded was perpetuated in the further evolution of ship-building, at any rate during the iron age, and is really the principle of naval construction to this day.

But I have not stated yet expressly on what principle these craft were made. Northern sources afford us no information. Whether the oldest Celtic literature does so, or not, I am unable to say. But we have an excellent Roman writer who gives us a sufficiently explicit hint of the method of their construction. In his first Spanish campaign during the civil war, Cæsar was brought to very great straits on the bank of the river Sicoris, which, on account of want of boats, he could not cross, and thus was foiled for a time in effecting an important strategic movement. So, in his own words, "he ordered the soldiers to make boats of the build that British usage had taught him in former years. *First*, the keel and the ribs were made of light timber: the rest of the body of the boats was woven together of osiers and covered by hides."[1] To this description Lucanus supplies a valuable addition in his "Pharsalia": "First," he says, "the white willow is woven together into a little craft by soaked osiers, and then, clothed in the hide of a felled young bullock, it swims out on the swollen river obedient to the passenger. Thus sails the Venetian on the sluggish Po and the Briton over the broad ocean." [1] Here, then, it is clear that the construction of the coracle type of boat was effected by two operations. First, by putting together of the wooden frame, strengthened by plaited wickerwork, which constituted the form of the craft; secondly, when this was done, by adjusting the water-tight outer case, consisting of neats' leather.

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[1] Imperat militibus Cæsar, ut naves faciant, cuius generis eum superioribus annis usus Britanniæ docuerat. Carinæ primum ac statumina ex levi materia fiebant; reliquum corpus navium viminibus contextum coriis integebatur. Cæs. Bell. Civil., I. 54.

That monoxyla were propelled by means of a paddle, single or double-bladed, is certain. At Viborg, in Jutland, there is exhibited a specimen of this craft, with the double-bladed paddle, some three feet in length, belonging to it, both having been found together in a bog some sixty years ago. As to the coracle, it is a paddled craft to this day. This was obviously the most natural method of propulsion for an utterly untrained navigator to hit upon. When he was on board his craft he wanted to propel it towards the goal he had chosen; he must therefore face the prow of it, in order to be able to exercise proper command over its gyrations and to correct deviations caused by winds and currents. But long experience of paddling must have exercised his faculty of observation in many ways. In the nature of man there is hidden an impulse which constantly urges him on to throw into locomotion, artificial locomotion especially, as much speed as is consistent with feasibility and prudence. To reach a given goal in the quickest way, *i.e.*, by the least loss of time, has all through its history been the tendency of man's sea-faring activity.

The primitive paddler was probably quite as impulsive as any of us, perhaps a good deal more so. He could not have failed to observe in the long run that it was impossible to put the same strength into a paddle stroke, which was produced by one arm pulling the paddle-blade towards the person, while the other arm guided the handle in a direction opposite to that of the blade, as would be put into it, if it were produced by the united strength of both arms, aided by the muscular force of the whole body, properly poised. Until a mode of propulsion on this principle was adopted, there was no art of *rowing*, in the proper sense, yet known. The introduction of that reform into nautical practice, however, must have been a very slow process, because it depended on auxiliary inventions, which were far from obvious. Rowing involved the invention of the thole-pin, "keipr," against which the oar could be pulled. That invention again necessitated the contrivance of the oar-strap, "hamla," to keep the oar in its place against the thole-pin, and to enable the rowers to back-water when necessary.

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[1] Primum cana salix madefacto vimine parvam
Texitur in puppim, cæsoque inducta juvenco
Vectoris patiens tumidum superenatat amnem.
Sic Venetus stagnante Pado, fusoque Britannus
Navigat oceano. Pharsalia, IV. 130-136.

But abandoning paddling for rowing meant really that the propelling force on board turned blind, in that the rowers had to occupy on the benches a position the reverse of that of the paddlers, and thus turned their back upon their own goal. This had to be remedied, and an eye had to be provided for the craft gone blind; a man was told off to take in hand the steering; he was provided for the purpose with a steering oar; and a loop, through which the handle of that oar was taken, was fixed to the gunwale of the craft at a suitable distance from the stern, on the right-hand side. Out of this primitive steering contrivance grew the steering apparatus, fixed to the right-hand side buttock of boats, which we find in the Viking ships that have been unearthed in Norway, and to which I shall allude again. In that position the rudder remained, according to the authority of Jal ("Archéologie navale") till the beginning of the fourteenth century. Nicholaysen, the able Norwegian antiquary, has found no instance of a rudder hinged on the stern-post earlier than that of the dragon-ship seal of Bergen of 1299. The earliest instance of rudder so fitted in England seems to be that of the man-of-war "La Félipe," built for Edward III. at Lynn, 1336. In the seal of Dover dating from 1335 the rudder is in the old position; but that may simply be a matter of sphragistic tradition.

When rowing at length had been mastered, all the main difficulties of the problem, "how to make a highway of the surface of the water," had been solved. There remained, of course, the crowning accomplishment: the mast and the sail. But the inventor rested for a long time on his oars before reaching that climax.

I may remark here that in the old language of Scandinavia the terms for mast are "vöndr," a wand, "viða," pole of wood, "viðr," "tré," tree, and most commonly, "sigla," perhaps, the bendable, pliable thing; all names apparently indicative of the bending effect the wind-weighted sail has upon the pole it is attached to. But "mast(r)" is a term utterly foreign to the Scandinavian idioms, never occurring in any song, saga, or law-code of the old time. It is confined to the West Germanic idioms, O.H.G., M.H.G., L.G., Du, and A.S. The commercial predominance of the Hansa in the Baltic from the middle of the twelfth century probably brought the term to the North, where it is now in universal use, even in Iceland, though the purists are endeavouring to keep "sigla" alive.

What "segl" *may* mean originally is very doubtful. It is a common Teutonic word, and may possibly, as a philologist has suggested, be radically allied to Latin "*sec*" in "secare," with a primitive meaning of "the cut out piece" (of cloth). If it could be connected with the old Scandinavian stem, *sig*, in "segi," "sigi," a strip, a torn out piece, it would mean collectively the thing made of strips or sections of skin, which presumably was the material out of which sails were made in the North before the culture of flax was known.

Passing now over to the consideration of the strake-built boat, I take the earliest type of it to be represented by the rock-carvings of Sweden and Norway. The shape, as well as the size of the originals copied here preclude their having been monoxylous or of the coracle kind. On board some of the craft there are shown as many as thirty rowers, or presumably such.

A point that strikes at first sight is the fact that the ships are represented *in groups*. This seems to show that we have not to do with the work of artists merely amusing themselves by practising naval drawing; we seem to have before us representations of fleets, or, in other words, records of *events*, of naval actions, *history* written in picture language.

These carvings present to us two distinct types of craft: one with stem and stern-posts raised to an abnormal height, taking, at some distance from the gunwale, an inward bend, and terminating in an outward turn, meant, perhaps, for some animal's head; the other distinguished by the absence of any prominently high stem and stern-posts. Some of the boats of the former type look as if they had two keels; the lower of the two extends beyond the upper or inner at both ends, and takes an upward bend clear above the water-line, and sometimes as high as the stem and stern-posts of the inner boat. We may perhaps here have to deal with a protective outer case and a ramming arrangement. This is rendered probable by the fact that, exceptionally, the prolonged lower keel takes a downward bend into the water at one end of the boat. Exclusively with this type goes an object which seems roughly to resemble the form of a pair of bellows standing on the pipe end; on the larger boats two of these objects are seen placed where, roughly, the length of the craft divides by three. An almost identical object may be observed on an Egyptian boat (sixth dynasty), copied from a carving on the walls of the tomb of Api at Saggâra,[1] apparently connected with the apparatus for steering. No other objects of attributive nature are shown in connection with these rock-carved ships: no oars, rudders, row-locks, masts, or sails.

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[1] G. Maspero, "Dawn of Civilization," 1901, p. 393.

These carvings show not only two types of ships, but also two types of men: the one somewhat stout and stunted of leg, the other tall, slender, in a tight vest and trousers. The former is mostly associated with rural scenes, ploughing and the like[1]; the latter principally with the high-prow ships. One is tempted to see in this type the *miles bracatus* of Gaul.

Archæologists are mostly agreed that these carvings probably date from the bronze age. They represent a weapon, the sword, which did not yet exist in the stone age, and in a form not used in the iron age, but quite typical for the bronze age. The originals copied by the rock-carver must have been without a guard, but two-edged, and rather broader about the middle than up by the grip; these are the typical peculiarities by which the sword of the bronze age distinguishes itself from the guard-hilted, one-edged, mostly straight-bladed sword of the iron age.

Opinions are divided as to the nationality of the type of the high stem and stern-posts—the other, of which a whole fleet, apparently drawn up in line of battle, is seen on a rock-face at Tegneby, Bohuslän, Sweden, seems a genuine Northern type. From the fact that Phenician ships, as represented on ancient coins of Tyre and Sidon, show a striking similarity to the former type, some archæologists have concluded that Phenecians once upon a time established themselves on the Baltic. Professor Montelius discountenances the idea on the ground that the bronze culture found its way up to the North overland from the shores of the Mediterranean, particularly the Adriatic.

But perhaps the culture of bronze found its way north

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[1] I exclude from this type the nine oddities by which one boat is manned, five of which seem to be engaged in the act of fanning. They seem to have an air of magic about them. All, but the excessively thickset animal-headed foreman, seem to be meant for females.

both by land and sea. We do not know how the ships were built which brought Pytheas of Marseilles up to the Baltic and Norway in the fourth century B.C. But his journey was undertaken in the interest of the commercial community of Marseilles,[1] who must have learnt from somewhere that the Baltic trade was worth the cost of such an expedition; that means that, before the days of Pytheas, Gauls and Scandinavians met on trading terms presumably on the Baltic shores.

Here I should like to draw attention to Cæsar's highly interesting account of the most advanced people he came in contact with in Gaul—the Veneti, whose chief city was Dariorigum, now Vannes, in Morbihan. First he describes their towns and habitations. This was about the manner in which their towns were situated:

> They were placed at the outermost edge of tongues of land and nesses, and neither was there access to them on foot when the flood-tide had arisen, which happens twice in the space of every twelve (twenty-four) hours, nor by ships, since with the tide ebbing they might come to grief on the shallows.[2]

About the sea power of these people Cæsar says:

> This state exercises by far the most extensive influence of any throughout the whole sea-board of these regions, both because the Veneti have a large number of ships in which they are in the habit of sailing to Britain, and because they excel all the rest as to knowledge and skill in matters nautical, and because, in consequence of the great violence of the vast and open sea with harbours few and far between which they control themselves, they hold as tributaries almost all those who resort to making use of this water-way.[3]

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[1] Elton, "Origins of Engl. History," p. 12 ff.

[2] Erant eius modi fere situs oppidorum, ut posita in extremis lingulis promontoriisque neque pedibus aditum haberent cum ex alto se æstus incitavisset, quod bis accidit semper horarum xii spatio, neque navibus, quod rursus minuente æstu naves in vadis afflictarentur. Cæsar, B.G. III. 12.

[3] Huius est civitatis longe amplissima auctoritas omnis oræ maritimæ regionum earum, quod et naves habent Veneti plurimas, quibus in Britanniam navigare consuerunt, et scientia atque usu rerum nauticarum ceteros antecedunt et in magno impetu maris vasti atque aperti, paucis portibus interjectis, quos tenent ipsi, omnes fere, qui eo mari uti consuerunt, habent vectigales. l.c. III. 8.

Lastly, he gives the following account of their ships:—

> For their ships were built and fitted out in this way: their keels were somewhat flatter than those of our own ships, that they might the more easily encounter shallows and the ebbing of the tide; the prows, being *very much raised and the sterns in a like manner*, were adapted to heavy seas and high gales; the ships were wholly made of oak, so as to be able to bear any strain and buffeting; the thwarts were made of planks a foot broad, and were fastened by iron bolts an inch thick; the anchors were attached by iron chains instead of cables; for sails they had skins and soft-tanned thin leather, either because of want of flax and ignorance of the use of it, or, which is more probable, because they thought ordinary sails could not stand the great tempests of the ocean and the stress of high winds, nor could such heavy ships be quite conveniently manœuvred by means of them.[1]

This, then, is the state of things on the western coast of France in the century immediately preceding the Christian era. This eminence in ship-building and sea-power must have been attained by a very long process of evolution. Improvement in ship-building invariably means extension of sea-voyaging. It stands to reason that the Veneti must have known how to thread their way along the shores of their own continent practically to any distance to which prospect of commercial gain was ready to pilot them, seeing that from the Bay of Morbihan (which presumably was their chief base) they were in the habit of sailing over to Britain across the northern waters of the broad and boisterous Bay of Biscay. In view of the impetus given to commercial enterprise by the journey of Pytheas to the amber-bearing tracts of the coasts of the North Sea, to the Baltic, and further up to Norway, I do not see what cogent reasons can be urged against the assumption that the Veneti may have been in communication with the North even for a very long time previous to their disastrous acquaintance with the ruthless conqueror of Gaul. The peculiarity in the build of their ships which he considered so noteworthy, the *proæ admodum erectæ atque item puppes*, is just the most striking feature of the rock-carved vessels. As hinted above, the opinion prevails among Northern archæologists that the high-posted, rock-carved ships must be foreign. Considering the information supplied by Cæsar, and the evidence of probability at present available, the Veneti seem to possess as good a title to them as any other foreigner.

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[1] Namque ipsorum naves ad hunc modum factæ armatæque erant: Carinæ aliquanto planiores quam nostrarum navium, qno facilius vada ac decessum æstus excipere possent; proræ admodum erectæ atque item puppes, ad magnitudinem fluctuum tempestatumque accommodatæ; naves totæ factæ ex robore ad quamvis vim et contumeliam perferendam; transtra ex pedalibus in altitudinem trabibus, confixa clavis ferreis digiti pollicis crassitudine; anchoræ pro funibus ferreis catenis revinctæ; pelles pro velis alutæque tenuiter confectæ, hæc sive propter inopiam lini atque eius usus inscientiam, sive eo, quod est magis verisimile, quod tantas tempestates oceani tantosque impetus ventorum sustineri ac tanta onera navium regi velis non satis commode posse arbitrabantur. l.c. III. 13.

By way of digression I feel tempted to ask:—Is it at all likely that the Veneti have anything to do with the Vanir of Northern mythology? To this no positive answer can be given at present. The stems of the two names are identical. I have shown already that probably the rock-carvings represent sea-fights, and two types of men, as well as two types of ships. According to Vøluspá, 23, 24, the *casus belli* between Odin's folk, the Æsir, and the Vanir was "afráð," vectigal, tribute. On the stone of Tjängvide, in Gotland, we find on the lower panel represented, as I think, a foreign ship,[1] with stem and stern posts enormously high; on the upper, Odin, seated on Sleipnir with his right arm raised for a throw (of a spear); this seems to remind one of: "Odin hurled, into the host he shot," that being his answer to the question of paying the "afráð." Freyja, Niord's daughter, was a sacrificial priestess, "hofgyðja" (among the Vanir), and the first to teach among the Æsir enchantments after the wont of the Vanir. With this may be compared the following from Pomponius Mela:—

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[1] The whole sail is covered with network. Does that, by chance, represent a sail of skin on to which, in the form of a net, are stitched cords for the purpose of giving additional strength to a material that never could have served its purpose very effectively?

> Sena in the British sea, opposite to the shores of the Ossismii, is famous for the oracle of a Gallic divinity, the priestesses of which, sacred to a perpetual state of virginity, are said to be *nine in number*. They are called *Gallicenæ*, and are supposed to be endowed with singular genius; to put in commotion sea and winds by means of incantations; and to change themselves into whatever animal they please; and to cure disorders that to others are incurable; and to know and to predict things yet to come; but that they only devote themselves to sea-faring people and those who have journeyed solely for the purpose of consulting them.[1]

It seems clear that this "Gallicum numen" must have been a guardian divinity of the interests of sailors *(navigantes)*, to whom only the wizard "antistites" of its oracle were "devotae." By their "carmina" these priestesses controlled wind and sea, the empire of the divinity they served. We have seen above (page 10) that NIORD, the god the Æsir adopted from the Vanir, was worshipped as the swayer of wind and sea, and as the propitious dispenser of favours to sailors and fishermen. In their functions, therefore, Niord and the "numen" here in question would seem to cover each other. This is not all: Niord had *nine* daughters who were skilled in runes, *i.e.*, in magic: "*Hér 'ro rúnar, er ristit hafa Njarðar dœtr nio.*" "Here are runes written in by daughters nine of Niord," Sólarljóð, 79. The relation between Niord's and Ægir's, obviously late, nine daughters cannot be discussed here. The shape-changing power recalls strikingly not only Odin's skill in that respect

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[1] Sena in Britannico mari, Ossismicis adversa litoribus, Gallici numinis oraculo insignis est: cuius antistites, perpetua virginitate sanctæ, numero novem esse traduntur. *Gallicenas* vocant, putantque ingeniis singularibus præditas; maria ac ventos concitare carminibus; seque in quæ velint animalia vertere, sanare quæ apud alios insanabilia sunt, scire ventura et prædicare, sed non nisi deditas navigantibus, et in id tantum ut se consulerent, profectis.—Chorogr. iii. 6.

"Ossismii" was the name of the people who occupied territory northwest of that which in Cæsar's time was held by the Veneti. "Galli Senas vocant" is a conjectural reading adopted by some editors without MS. authority.

(taught him by Freyja, who first introduced among the Æsir the science of wizardry),[1] but especially the sorcery of the Finns up in northernmost Norway, with whom shape-changing was a speciality of magic. Are we to take it that *gall* in "Gallicenae" is allied to or identical with the Celt. stem *gal* in "galô,"[2] I call; Ir. "gall," cygnus, whooping swan; Cymr. "galw," vocare; Bret. "galvaden," cri d'appel; "gàlu," appel.[3] If so, are we not warranted in assuming that the common Teutonic stem *gal-* (Scand. "gala," cantare; "galdr," carmen, incantatio) is a very ancient Celtic immigrant, like, *e.g.*, *rík*, *rig*, *reich*. As to "cen-a," is that a term of Vulgar Latin formed from the stem of Celt.-Ir. "can-im," I sing, in analogy with the classical *cen* in "tibi-cen"? If so, "cenæ" would mean "cantantes," or "cantatrices," presumably of that which *gall-* in Galli implied=incantatio, "Gallicenæ" therefore=carminum, incantationum cantatrices?

I have to content myself at present with thus far drawing attention to these points.

The earliest *literary* account of Northern ships, so far as I know, was penned in Rome, probably in the course of the latter half of the first century of our era. In the 44th chapter of his "Germania" Tacitus (ob. A.D. 108), passing from the account of the various nations who inhabited the southern littoral of the Baltic, goes on to that of the states of the Suiones "in the very ocean." "Besides in men and arms," he says, "they are powerful in fleets. The build of the ships differs (from that of Roman ships) in this, that at either end there is a prow so shaped as always to be ready for landing; they neither make use of sails nor adjust the oars in a row to the sides; as in certain river boats, the rowing is loose and changes either way as necessity demands."[4]

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[1] Ynglinga Saga, Heimskringla (F. Jónsson), ch. 4.

[2] W. Stokes, "Urkeltischer Sprachschatz," p. 107.

[3] Victor Henry, "Dict. étymologique du Breton moderne."

[4] Suionum hinc civitates, ipso in oceano, præter viros armaque classibus valent. Forma navium eo differt, quod utrinque prora paratam semper

The Suionum civitates, say the commentators of Tacitus, probably truly, are the inhabitants of the Scandinavian peninsula. At the time of Tacitus the ships of these people, then, had two prows, but no stern. The real meaning of Tacitus' statement that both stems were equally suited for landing must be that the ships were not steered by a rudder, but were kept in their course by means of paddling, and this Tacitus himself proves by his description of the "remigium solutum et mutabile ut res poscit hinc vel illinc," and by adding that it is a method of rowing followed on certain river-boats. When the course of ships of this description was reversed there was no need for turning round the craft; the only thing that turned round were the paddling crew on their seats. It was but natural that such ships should carry no sail, and Tacitus' description of the "*remigium*" proves that his statement in respect of the sail is perfectly true; for without a rudder the sail is impossible. Here the steering was done by the paddlers themselves, who had their eyes constantly fixed on their goal, and plied their paddles accordingly. The expression "*classibus valent*" clearly indicates that Tacitus was thinking of war vessels, and seems to preclude the idea that he had monoxylous craft in his mind; nor, if that had been the case, is it likely that he would have omitted to mention the fact, seeing that he evidently had his eye on the points

adpulsui frontem agit, nec velis ministrant, nec remos in ordinem lateribus adiungunt; solutum, ut in quibusdam fluminum, et mutabile, ut res poscit, hinc vel illinc remigium.

It is not quite obvious what the exact meaning may be of one or two points in this statement. "Solutum remigium" seems to be explained by "nec remos in ordinem lateribus adiungunt," which points to the ships as unprovided with both row-locks and oar-straps; hence the rowing was free-handed, the oar being independent of any attachment to the gunwale. This, I think, is tolerably certain. But "mutabile hinc vel illinc" can mean either: changeable "from side to side," according as gyrations should call for correction, or: "in this or that direction," when reversion of course was in question, or, it may mean both. Perhaps the second sense has most in its favour. Cf. "mille naves sufficere visæ . . . plures adpositis utrimque gubernaculis, *converso ut repente remigio hinc vel illinc adpellerent.*" Tacitus, Ann. II. 6.

wherein the build of the "naves Suionum" differed from that of Roman ships. It seems therefore safe to assume that he himself thought he was describing strake-built vessels. These ships, being war vessels, would be too broad for a single row of paddlers, seated in the middle of the thwarts, to ply each his double-bladed paddle on either side of the boat, an arrangement which would have made a sea-battle next to impossible. Therefore, I take it, the paddlers were seated along either side, each with a one-bladed paddle, leaving the middle of the boat free for the fighters to move in. As yet, then, rowing, rudder, mast, and sail would seem to have been unknown in the North.

From the time of Tacitus till the rise of Icelandic literature, in the twelfth and thirteenth centuries, I am not aware that anything in the way of real description in writing exists relating to the construction of Northern ships.

But chance has favoured us at different dates in modern times with finds of remains of boats built during the long period that intervenes between Tacitus and the literary era of the North, and these finds give us the best information possible about the state of naval architecture at the time from which they date.

Leaving out of account the many instances of discoveries of faint traces of buried ships which have been made in various localities about Scandinavia, I shall confine myself to the finds of Nydam, Tune, and Gokstad. A new ship-find at Tönsberg, on the Christiania fjord, I must leave out of account, as it still awaits description.

In the year 1859 the oldest naval relic in the North was found in the peat bog of Nydam, near Flensborg, in the Duchy of Sleswick. It was only a part of an oar, the remaining fragment of which was discovered in 1862. In the following year, on August 7th, some remains of a boat were dug out, and on October 18th that year the famous Nydam boat of oak was discovered, and on October 29th a boat of fir was dug up on the same site.

The first of these three boats was in a very bad state of preservation. But from the fragments obtained of it, it could be concluded that the build of it was executed on the same principle as that of the other two.

The fir boat was fairly preserved, but in pieces, which were secured from their bed and placed on dry land, covered over with peat, in order to protect the soaked timber against the effects of the air until the restoration of the oaken boat should be completed.

In the meantime, however, the war broke out; the German victors left the relic to take care of itself, and what with exposure "to weather and the Vandalism of strangers," the invaluable find has been irretrievably destroyed. This boat was built on the same principle as the oak boat in all essential particulars but one: the keel plank, fifty-one feet four inches long, terminated at either end in a kind of pointed spur, slightly bent upwards, and stretching out about five feet beyond the point where stem and stern-posts were joined to the keel. On account of its slight upward turn from the horizontal line of the keel this spur would always be below water, the deeper the more heavily laden the boat happened to be. This is a most interesting characteristic. It is possible that it may betray traditional connection with the somewhat similar arrangement which we noticed in one type of the rock-carved ships; and it seems to be removed beyond doubt that this spur was intended for the purpose of ramming an antagonist somewhere between waterline and garboard-strakes. Thus this boat, which now exists only in the careful drawings of Professor Engelhardt, stands a unique witness to the fact that, even in the early younger iron age, the idea of disabling a hostile ship by means of ramming had entered into the science of naval warfare.

The oak boat, which is known as *the* Nydam boat, was discovered on the same site as the preceding, and close to it. Both rested at the bottom of the bog, beneath a peat soil of from 4 to 7 feet thick. All the iron details had been utterly dissolved by the water, but clear indications were obtained of the manner in, and the extent to, which iron had been employed in the building of the craft. By the dissolution of the iron and other fastenings the strakes had fallen out flat on the bottom, the stem and stern-posts likewise, and the ribs lay about in various positions. The boat had been deliberately sunk, as large holes were found cut through the strakes on one side below the water-line. It was complete, and had only to be put together again; and so reconstructed by an expert Copenhagen restorer of antiquities, Mr. Stephensen, it may now be seen in the Museum at Kiel.

It is a boat of 45¾ feet of straight keel, and 69½ feet from stem to stern between the points where gunwale and posts meet. The keel plank is 2 feet in width, but there is next to ***no external keel.*** Five clinker-worked strakes on either side, each 15 to 20 inches broad, secured to each other by burred iron nails, formed the hull of the craft, which at its widest is 10¾ feet. The depth of the vessel amidships is 4 feet 1 inch, rising at fore and aft posts to 6 feet 10 inches. In form the stem and the stern of this boat are *identical.* It has 14 oars aside, abnormally short for the size of the vessel, the longest 11 feet, and row-locks, with oar-straps attached, had been secured to the top of the gunwale by means of bast-ropes; an arrangement which must have made rowing both a weak and an interrupted performance. Being a rowing boat she was provided with a rudder, in the shape of a broad-bladed (18in.) oar, 9 feet 7 inches long. The ribs or frames are made of one piece of wood, naturally grown so bent or crooked as to serve their purpose. They must have been very difficult to procure, and very costly, to judge by the experience of modern ship-builders, who find pieces of naturally-grown wood suitable for knees about the most expensive articles in a wooden ship.

Beneath every rib there are left standing in each plank two knobs, of 2½ inches in height, with a hole drilled through them, and through the ribs, right over these knobs, are run corresponding holes from side to side;

by a bast-rope run through these holes the strakes were fastened to the ribs. To this and other peculiarities about this boat I shall revert presently. Nothing in or about the boat was found indicative of mast or sailing apparatus.

In close proximity to this Nydam boat was found a hoard of Roman coins, 34 in number, minted between A.D. 69 and 217. How long it took the last dated coin to travel from the Roman mint to Nydam bog it is impossible to say. Guesses as to the age from which the boat may date assign it to the third, at the latest to the fourth, century of our era.

Points particularly noticeable about this craft are:

(*a*) The almost total absence of external keel.
(*b*) The identical formation of stem and stern.
(*c*) The shortness of the oars.
(*d*) The arrangement of the row-locks.
(*e*) The mode of attaching the strakes to the ribs.

This is the earliest extant specimen of a strake-built, iron-riveted, floating craft in the North. Between the building of it and the date of Tacitus' description of the ships of the Suiones there lies a period of time, possibly not exceeding 250 years. Like those ships this is distinguished by not being a sailing craft. The absence of external keel (*a*) I take to be a traditional family feature come down from the coracle ancestor. The identity in form of stem and stern (*b*) shows that as yet the old form of the paddled ships of the Suiones was traditionally maintained, although rowing had now been invented. That the art of rowing was still in its infancy is evidenced by the fact that (*c*) the oars are so abnormally short in proportion to the size of the boat; also by the row-lock arrangement (*d*). The row-lock rises, like a short bent horn, from a block of wood, which, fitted lengthwise to the top of the gunwale, is tied to it at either end by a bast-rope, holes being made through the gunwale for the purpose. No matter how tightly this row-lock block was fixed, it was bound, under rowing, to slide on its gunwale base in answer to the impact of the oar stroke, and to wear out its bast fastening in a short time.

Why the row-lock block should not have been secured firmly by means of iron nails or bolts to the gunwale seems, at first sight, so strange as to defy explanation. But when a vessel has two prows and no stern, properly speaking, strange things must happen in the transit of one mode of propulsion into another. I have explained above (page 28) that when the course of a paddled ship had to be reversed there was no need for any turning round of the craft, since her fore and aft were prows of identical form; only the paddlers turned round on their seats. Here is a boat of the same construction. Traditional custom is often strong out of all proportion to its reasonableness or expediency. Might not, therefore, the row-lock arrangement mean this, that when the boat's course was reversed, instead of turning her round by means of the short oars and the slight help of the rudder-oar, which, in so heavy a ship would have been somewhat of a time-losing process, the rowers simply turned round on their benches, undid the row-lock block, and reversed its position? This is Professor Engelhardt's theory also, I observe, although he arrives at it from a standpoint different from mine.

But perhaps the most interesting feature about this most remarkable of all boats is (*e*) the mode in which the strakes are attached to the frame timbers, the ribs, as described above. On this peculiarity Professor Engelhardt remarks:

> This is again a fact highly surprising in a nation familiar with the use of iron, and able to work it so well as their damascene swords prove that they could. At the same time, it is possible that a loose connection between the framework and the planking of the boat served to give more elasticity to the sides, and that boats built in this manner went through the surf and great waves more easily than those more strongly built.

This I beg leave to doubt. Here again I think we have to deal with traditional custom modified by the conditions of a new building material. In a boat built wholly of wood the strake covering answers the purpose and takes over the function of the hide-covering of the earlier coracle. For I take it for granted that the coracle was the immediate ancestor of the strake-built craft. We have seen above (page 17) how coracles were built: the framework being first finished and the hide cover put on afterwards. On the same principle, and by the same process of construction, the Nydam boat was evidently put together, as is proved by the fact that the above-mentioned knobs on the inside of the strakes, with holes made through them, correspond exactly with the lateral perforations of the ribs; those perforations must have been made *before* the strakes were fitted to their position. What happened was obviously this: to the keel were first fitted the stem and stern-posts; then the ribs were adjusted at their fixed intervals, next came the planks on which, where the perforated knobs were to be left standing when the rest of each plank was cut down to its regulated thinness, were made marks showing the distances of the ribs that this or that plank would cover, as well as the distances between the holes made through the ribs up from the bottom to the top. As the hide in the coracle was secured by means of sewing material to the frame-timbers to prevent its slipping about, so the wooden strakes were secured to the in-timbers by means of bast-ropes, to prevent them bulging out under weight-pressure, and breaking away from the rivets or disturbing the water-tightness of their jointures. I will finally remark that the price of iron at the time may have had most to do with the use of the old binding material, the bast, where, to us, at this time, it seems obvious that iron bolts should have been used in preference.

By a wide jump we come from the Nydam boat to the ship unearthed at the manor of "Haugen i Tune, near Sarpsborg, on the river Glommen, south-eastern Norway, in 1867." In respect of straight keel, this is a boat by about 4 feet smaller than the Nydam craft and, like it, is built of oak strakes, but some details are made of other kinds of wood. The clincher-joined strakes are secured to the ribs by the same means and contrivance as in the Nydam boat, with the exception, however, that the topmost planks are fixed by wooden nails to the knees inside. It differs from the Sleswick boat further in being a sailing boat, consequently having external keel and higher free-board, 12 strakes forming the hull of it. So here we have the first specimen of a sailing craft in the North. That it was a rowing boat as well goes without saying, but how the rowing apparatus was contrived could not be ascertained on account of the decayed state of the wood-work.

A much better preserved find was the longship discovered in 1880, near the manor of Gokstad in Sandefjord, Southern Norway. This is an oak-built war-galley with upwards of 65 feet of straight keel and 77 feet from stem to stern, width amidships 16¾ feet, and depth at the same point 5½ feet, rising to 8½ at either stem. The hull counts 16 strakes aside, each 7 to 9 inches wide and ¾ inch thick, all clincher-worked by means of burred iron rivets. It had 16 oars aboard, varying in length, the longest measuring some 17 feet. But for the purpose of rowing, instead of row-locks adjusted to the top of the gunwale, it provides oar-holes through the fourteenth strake, each with a slit in its aft-side for the blade of the oar to pass through in being run out or drawn in. These oar-holes, moreover, were provided with shutters, working on a pin, and fitted with a catch, by which they could be closed when the oars were not in use.

In common with the Tune boats, this one also has its strakes tied to the ribs by means of the knob arrangement described in the Nydam boat; only, in the choice of the lashing material there is a new departure, in that, instead of bast, withes from roots of trees are employed. So that still as late as about 900 the old tradition from coracle antiquity lives on, regarding and treating the straked hull as the wooden "hide," the waterproof covering of the all-important framework, the ribs, tie-beams, knees, etc.

A striking novelty in the Norwegian boats is the change of the position of the rudder from loose to fixed. Of this the Gokstad boat gives the best illustration. On the right-hand side buttock of the boat there are fixed two wooden cushions or blocks, one up by the railing, the other 2½ feet lower down; the topmost presents a flat surface, with a semi-cylindric perpendicular incision; the bottommost ends in a cone-formed top. A line drawn from the surface of one block to that of the other would run parallel with a line drawn perpendicularly on the keel of the craft, and that is the line the rudder occupies. For at the top its neck goes through a loop or grummet drawn through two holes, made at either side of the semi-cylindric incision in the top block, and running right through the railing, while through a hole in the rudder blade, exactly corresponding with one made through the conical block and the board of the ship, a cord with a knot at its further end was drawn which secured the rudder blade firmly to the cone. On the top of this cone, in obedience to the tiller, which fitted into a hole in the neck at right angle with the plane of the blade, the rudder moved easily, putting the ship on a starboard tack when the helmsman drew the tiller to him, and on a tack to port when he reversed the movement.

A feature quite new in the Gokstad ship is the introduction of the "dead-wood," a block which, fitted to the obtuse angle where the stem and stern-posts meet the keel, is both lashed and fastened by two rows of nails to either. This is the earliest instance I know of the use of this standing feature of the architecture of wooden ships even to this day (the lashing, of course, excepted).

Caulking was done even in the days when the Nydam boat was built; it then consisted of wool mixed up with some sticky substance not otherwise specified. In the boat of Tune the caulking is effected by loose ox hair, while in the Gokstad boat this hair is spun and twisted into a three-stranded cord, which, no doubt, was saturated with tar before being used.

By this time,—indeed a very considerable time before,—the art of ship-building in the North, from a very humble beginning, had reached such a state of consummation that practically the world's "wayless waters" had now been turned into waterways; what still was lacking was but improvement in detail on a safe and secured basis; for even the very important adoption of the bowsprit and the jib, together with the mainsail, was, I have no doubt, suggested by the varied experience obtained through the manœuvring of the square sail for the purpose of catching side winds, beating.

We may very well allow the Gokstad ship the honour to stand as a general type for the Scandinavian ships as we know them from the Sagas. On passing now over to the names of their various kinds and some of the terms connected with them, I will wind up this portion of my paper by adding that in building a ship, in historical times, three chief classes of smiths or ship-wrights seem to have been employed: the *head-smith* (höfuð-smiðr), the *stem-smith* (stafna-smiðr),[1] the constructor of the framework, and the *strake-smith* (*filungr, cf.* fjöl, a board). There were, besides, *joiners* ("sumir et fella"), at *carpenters* ("sumir at telgja"), *black-smiths* or *nail-makers* ("sumir saum at slá"), and lastly the unskilled *workmen* ("sumir til at flytja viðu").

The ships themselves may, not inconveniently, be classified according to the various purposes they were built for, which after all comes to much the same as grouping them according to size. We get thus the *boat class* proper, comprising the smallest craft; the *ship of burden class,* including ocean-going merchantmen; and the *navy class*, the warships.

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[1] The story of Thorberg *Shavehew* (Saga of Olaf Tryggvisson, Snorri, ch. 88) makes it clear that the stafna-smiðr occupied an inferior position to the höfuðsmiðr.

To the boat class "bátr" belong the various open rowing boats, whose size attains, however, considerable dimensions in the largest of them; the size here is determined by the number of oars: four-oarer, "ferærðr"; six-oarer, "sexæringr"; eight-oarer, "áttæringr"; twelve-oarer, "tólfæringr." But lesser boats than four-oarers, of course, there were.

The after-boat, "eftirbátr," or cock-boat, was naturally a very small craft; it went also under the name of "skipsbátr," ship's-boat. Whether it had any typical form of its own cannot, that I am aware, be ascertained. A very old name for a boat is "beit"; it is the genuine old Scandinavian term, while "bátr" is an Anglo-Saxon very early loan-word.

The craft that goes under the name of "ferja," also "róðrarferja" seems to have belonged to what I call the boat group. It is mentioned as doing not only the ordinary service of a rowing boat, but also that of a transport and victualling craft, which, for such a service, must have been of considerable size. "Róðrarferja," rowing ferry, distinguishes a ferry, so-called, from a river-ferry, not, as might be supposed, from a "sailing ferry," which is never mentioned.

The "kœna" was of old probably, as even now it is, a very tiny craft. The word is formally related to Icelandic "kane," a small wooden vessel, Norwegian "kane," a wooden bowl with ears, even as "hœna," hen, is to "hane," a cock.

"Karfi" is one of those objects which, from small beginnings, develop into something more considerable in course of time. It is taken by some antiquaries to be a foreign importation, from Latin "carabus," which in its turn was borrowed from Greek "κάραβος," a sea-crab, a boat. Isidor[1] describes the "carabus" as a small wicker-boat covered with raw hide. Similar names for, apparently, the same object are found in Finn. "karpa," basket, little boat; "karvas"; Quenic. "karvas"; Russ. "karbas"; Lapp. "garbe," "garbas," and V. Gay[1] mentions "corbe," as the name of fishing-boats in the Low-Countries. Surely the similarity of these forms to Scand. "karfa," Swed. "korg," Dan. "kurv," Germ. "korb," Lat. "corbis," a basket, is not altogether accidental. Once upon a time the northern "karfi" must have been a term for a very small crank vessel. In the compound "eikjukarfi" the second element is really a sort of translation or interpretation of the first, which we have already seen (page 9), was a tiny monoxylous sort of ferry boat; so that the "karfi," as to size and quality, was looked upon as but another edition, as it were, of "eikja." Sigvat, Olaf the Holy's marshal, was highly disgusted with the "karfi" as a river ferry, calling it "a cranky karfi," a "hlægiskip," ridiculous tub; had never seen a worse one, "sákat ek verra."[2] The main peculiarity of this craft is taken off very tellingly in the compound "karfa-fótr,"[3] the tottering foot of one reeling from drunkenness. The vast geographical spread of this name for a small crank boat points to its having been, once upon a time, a coracle in universal use throughout the continent of Europe.

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[1] Etymol. XIX., c. i. 26.

But in Norway, at any rate, the "karfi" also attained dimensions which placed it in class with the largest boats, or even with the lesser sea-going ships. Mention is made of "karfar" with from six to sixteen oars aboard.[4]

"Nökkvi" (A.S. naca, O.H.G. nahho, M.H.G. nache, Germ. nachen, Fr. accon) occurs chiefly as a boat with one man on board, and connected with trolls and giants. The author of Balder's myth[5] calls "Hringhorni" the ship of this god, a "nökkvi," adding that it was the largest of ships. This type of ship has been dead for ages, and the fantastic records of it belong to folklore literature. It plays really no particular role in Northern shipping tradition, and of its build no description is given.

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[1] Gloss. archéol.

[2] Heimskringla (F. Jónsson) II. ch. 91. [3] Ib. ch. 83.

[4] Egils Saga (F. Jónsson) p. 200, 113; Grett. S. (1859) p. 36; Heimskr. II. 77, 128.

[5] Snorres Edda I., 176.

"Barki" occurs once or twice, and is described by Snorri as a foreign ship's boat. The Latin name, "barca," seems to be mentioned for the first time by Paulinus Nolanus, about A.D. 400 (Kluge). The craft is defined by Isidore[1] as a small ship's boat. Suppósed to be of Celtic origin, and certainly occurs both early and frequently in Irish records.

Next in size above the boat class of floating craft was probably the "byrðingr," ship of burthen, frequently doing the service of a transport boat, "vista-byrðingr" (victualling boat). In dealing with Asbiorn Sealsbane's ship of this description, Snorri says that it was "haf-fœranda skip," a ship that could be used as an ocean-going craft, implying that there were such "byrðingar" as were not ocean-going. This particular one was a sailing ship, and had a striped sail and all rigging carefully found.[2] One portion of Harald Sigurdsson's fleet of well-nigh 240 sail, going to England, consisted of "vistabyrðingar."[3] But generally these boats were used in home waters for coastal service.

"Skúta" is a very frequently mentioned craft, which was both a rowing and a sailing vessel, and when it was exclusively propelled by oars was called "róðrarskúta." It was clearly, as a type of ship, a good deal smaller than the "snekkja," as we learn from Egil's Saga: Egil and his men pushed the "skúta" into the shallow sound, but there the "snekkjur" could not float.[4] It seems to have been used chiefly in home waters for coasting service. It was frequently used for warlike purposes, but does not seem, however, to have been exactly classed as a longship. Its size varied a good deal, for there are

[1] Etymol. XIX., c. i, 19.
[2] Heimskr. II. 244.
[3] Ib. III. 193.
[4] F. Jónsson's ed. p. 196.

skútur mentioned with ten or twelve, and others with fifteen oars aside, this being, I think, the largest mentioned. What distinguished this craft from the larger boats was mainly the proportion between length and width of hull. As the name indicates, it was built for speed, for "skúta" is radically allied to "skjótr," swift, "skjóta," to shoot, to pass swiftly. The name is still common in all the Scandinavian languages (Swed. *skuta*, Icel. *skúta*, Norw. *skuta*, Dan. *skude*), and means everywhere a small decked vessel. Kluge maintains Engl. "skute" (obs.), Dutch "schuit," Germ. "schüte" are all derived from the Scandinavian form; and the same would apply to O. Fr. "escute."

The regular ocean-going ship was the "knörr," both in the capacity of merchantman and of a man-of-war. Prominent mention of these ships is made even as early as the reign of Harald Fairhair. His court poet, Hornklofi, calls the ships that were engaged in the great sea-battle of Hafursfiord, 872 "knerrir," adding that they were adorned with yawning heads and graven "prow-plates." Most probably he himself was present at the battle, and, at any rate, his poem is an original contemporary document, and therefore a good vouch for the early existence of this kind of ship in the North. The name would seem to be a genuine Scandinavian one and the A.S. "cnear" a loan-word from the North. This also seems borne out by Ordericus Vitalis, who in his ecclesiastical history, under 1095, has a story to tell of "quatuor naves magnæ quas Canardos vocant" coming "*de Northvegia in Angliam.*" This evidently means that the subjects of "vocant" are Norwegians, as well as those who repeat the Norwegian name of the ship; and no Scandinavian name for a ship, but "knörr," could in Latin assume the form of "canardus." This was essentially a sailing ship, though, no doubt, oars could be used on them in case of need. It must be presumed that of this type were the ocean-going ships which so frequently are mentioned as awaiting fair wind in harbour, often for a long time, before it was found practicable to put to sea. Of this type must have been the "haf-skip," ocean-going ships, of which we hear so often, the name implying that they were distinct from home-waters' ships. The distinguishing feature about their build was that they were broader and of a higher free-board than any other class of the larger ships. This becomes evident from the description of the "Long Worm," Olaf Tryggvisson's great war-galley, to which I shall revert below.

Coming to the warships proper, the "langskip," we have only to deal with two types, the "snekkja" and the "skeið," the latter of which, under conditions to which I shall refer later, could be a "dreki," dragon. Generally, I think we may take it, the longship was a craft built for propulsion with oars. A naval expedition is always "rowed," "róa leiðangr," never "sailed." This is a stereotyped phrase in the old laws of Norway, and can only mean that, when it came into existence, the propelling force on board men-of-war was confined to rowers. This changed in course of time so far that warships made use of sails as well as oars. Being built for speed and for the accommodation on board of as many fighting men as possible, the main characteristic of these ships, the *length*, is naturally accounted for; and there seems to be no urgent reason for the supposition that we have here to deal with an imitation of the "navis longa" of the Romans. As the longship was propelled with only one row of oars, its free-board was much less than that of ocean-going vessels. The biggest longship ever built in Norway up to A.D. 1000, the "Long Worm," was "high of bulwark," *i.e.*, unusually so, "and," Snorri adds, "the bulwarks were as high as in a ship built for sailing the main," which clearly indicates that longships of lesser size fell short of that standard of free-board. They were not ocean-going craft, they were built principally for duty on the island-sheltered seas of the Scandinavian coasts and the comparatively quiet waters of the Baltic. During the colonisation of Iceland not a single longship is mentioned as crossing the "Iceland main."

Of the longships the "snekkia" (O.Sw. *snækkia*, mod. Sw. *snäcka*, Dan. *snække*, A.S. *snacca*) is the smallest, being most frequently mentioned as a "tvítugsessa," twenty-bencher, *i.e.*, a craft of forty oars all told. Exceptionally, however, the number of benches ran up to thirty, as in the case of Tryggvisson's war-galley the "Crane." This was, perhaps, a specially Swedish type of warship, as may be inferred from the fact that, in the old Swedish laws, it seems to be the standing term for a man-of-war, while "skeið" and "dreki" are never mentioned. Perhaps, too, the name is purely Swedish, "snäcka" being a Swedish term for various kinds of shells. It is noticeable that the type of warships used by the Wends is generally called "snekkja" or "Vinda snekkja." With 660 such the Wendish duke Ratibor made a raid on Kings' Rock, now Kongälf, in 1135, each "snekkja" carrying 44 men and two horses, which probably indicates a size corresponding to "tvítugsessa." In course of time, it would seem, this type of ship developed into an ocean-going size. It became known to Frenchmen, who gave the name of it the form of "esneke," "esneque" (besides the Latinized *isnechia*, *ilnechia*, *hilnachia*). A passage from Bishop Jacques de Vitry's "Historia Orientalis," relating to the siege of Acre in 1191, is instructive:—

> When few days had gone by there came Danes, Normans, Francs, Scots and other people . . . in welcome (?) ships which are called Necchiæ.[1]

where necchiæ is evidently a Frenchman's rendering of "snekkjur." If critics are right in changing *iocundæ* into *rotundæ*, which is doubtful, then the adjective would be indicative of the "snekkja" having evolved, in the twelfth century, into a ship of burden.

The typical longship was the "skeið." It is generally referred to as a twenty or thirty bencher. The great "skeið" belonging to the magnate of Sole, Erling Skjalgsson, told up two-and-thirty benches. If Olaf Tryggvisson's famous warship, the "Long Worm," was a "skeið"—I don't know what else it could have been—then that is the largest specimen of the pure *skeið*-type known, counting four-and-thirty benches. As to the meaning of this term, which in A.S. meets us in the form of "scegð," in Russian in that of "skedii,"[1] and which some linguists derive from Greek σχεδία, raft, float, I am inclined to derive it from "skíð," a thin board of wood. "Skeið," in the sense of wooden spoon, a ladle, must, at any rate, be derivable from "skíð." I am disinclined to think that "skeið" in the sense of ship can have a different origin. The original sense then should have been the boarded, the straked craft.

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[1] Diebus paucis evolutis venerunt Daci, Normanni, Franci, Scoti, et ceteræ gentes . . . navibus iocundis quæ Necchiæ dicuntur." Martene, "Thesaurus novus Anecdotorum," Tom. III. col. 283.

As to the "dreki," dragon, the question is: Was it a special type of warship or merely a "skeið" with a dragon's head fitted to the prow, and a dragon's tail to the stern? Before answering the question definitely let us see how the "dreki" stands in relation to time. In the course of the winter A.D. 868 Snorri states that Harald Fairhair "let build a great dragon-ship (dreka mikinn), and fit it out in the noblest fashion." It is a remarkable thing that this, the first *great* dragon mentioned in Northern history, and built by the greatest lord on record in the North, is left undescribed altogether. This is the more striking when we compare the graphic accounts given of *all* the other dragon ships mentioned by the old historians. No less surprising is the fact that this alleged great dragon of Fairhair produces no imitation at all. For one hundred and thirty years after 868 there is no mention of a dragon ship; and when the dragon type of ship comes into vogue, the primary pattern of the much admired innovation comes from a magnate in Halogaland, Raud the Strong. It is perfectly clear that the Halogaland dragon took Olaf Tryggvisson and the people of Norway by admiring surprise, for after the fashion of the "Short Worm," as Olaf called the dragon, he let build the "Long Worm," which in turn became the pattern of King Harald Sigurdsson's greatest warship, and King Eystein Magnusson's as well. I think it is also possible that the greatest of all dragons on record, Knut the Great's, of sixty oars a-side, was built on the pattern of the "Long Worm," which, on the occasion of the battle of Svold, filled his father with such awe and admiration. Of course, it goes without saying that Fairhair had a flagship of his own in his sea-battles. Hornklofi's song, too, on the battle of Hafrsfirth, bears witness to the warships having been provided with yawning heads, "gínandi haufuð," but these were "knerrir" not "dragons."

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[1] Nestor, Schlösser, IV. 17, 28, quoted by J. Fritzner.

But the description of Raud's dragon seems to show that the tradition regarded this ship as a new discovery in naval architecture:

> Raud had a great dragon, "dreka mikinn," and gold adorned head(s) thereon, and that ship counted up thirty benches and was big in proportion. . . . Then King Olaf took the dragon which Raud had owned and steered it himself, for it was by much a bigger and braver ship than the "Crane."[1] Fore there was a dragon-head and aft a "crook," and forth from it a tail-fin, and either bow and all the stem was inlaid with gold. This ship he called the "Worm," for when the sail was up it showed as if it were the wings of the dragon. This was the fairest ship in all Norway. . . . (The "Long Worm") was a dragon, and built after the pattern of the "Worm" which the King had taken in Halogaland.[2]

There seems to be little doubt that we have here to deal with what the old historians regard as the *first* dragon known to tradition in the North.

Returning to the above question, I believe the difference between a "skeið" and a "dragon" was, in the main, only decorative. When the allies, before the battle of Svold, stand gazing admiringly at Olaf Tryggvisson's fleet sailing up, the "skeið" of Erling Skjalgsson passes by, and Svein Twibeard, himself an old Viking, says: "Now Olaf Tryggvisson is afraid since he dares not sail with the head up on his dragon."[1] This shows that when there were no decorative appointments to go by, even an experienced eye could not, at a distance, tell a "skeið" from a "dragon."[2] But when to a *skeið*-built ship were adjusted the head and tail of a flying dragon, the craft was a dragon-ship proper, presenting that "prora admodum erecta atque item puppis" which Cæsar was so struck by in the ships of the Veneti.

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[1] Which, however, had an equal number of berths or benches.

[2] Heimskringla, I. pp. 396, 401, 414.

Now I think it must be admitted that the historical evidence is altogether in favour of the dragon-type of ship hailing from Halogaland. But where did the Halogalanders get it from? Neither Greeks, Romans, nor Britons had dragon-ships of their own, that I am aware. Was the invention native to Halogaland, or—my query will sound wild—did the Veneti in far distant prehistoric times know that commercial gold-mine, the Lofoten fishery of Halogaland? If so, the Halogaland dragon-type of ship is self-explained. That no tradition should exist pointing to any such connection is but natural: Cæsar had the Veneti sold by auction 56 B.C., and their state was wiped out for ever.

Dragon-ships are mentioned, after the days of Olaf Tryggvisson, as flag-ships of Harald Hardrada, of thirty-five oars a-side, exquisitely fitted out both as to hull and rigging; figurehead, bows and tail astern lavishly gilt. His grandson, King Magnus Barefoot, had a stately dragon in his Western warfare. His son again, King Eystein, built one on the pattern of "the Long Worm." The last ship of the type mentioned in Saga was the "Dragon" of Hakon the Old, King of Norway, 1217-1263. Olaf the Holy built two ships, which are mentioned as of the dragon type, but did not adorn them with figureheads of the heathenish monster; one, which he called "Carl's-head," "Karlshöfði," he adorned with the head of a king, which he had carved himself; the other, called the "Bison," "Vísundr," was provided with the head of that animal, all gilt. Both ships were of the largest type of "skeið."

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[1] Heimskringla, I. pp. 435-6.

[2] It should not, however, be overlooked that the change which Thorberg Shavehew made in the top-strake of the "Long Worm" is most naturally explained as having had for object a closer approach to the gunwale outline (in relation to the waterline) of the "Short Worm." The object was, in my opinion, to diminish the curve of the gunwale line between prow and stern-quarter, and make it more parallel with the water line.

In the reign of Olaf the Holy we meet for the first time with the term "búza" connected with the building of warships. In 1026 Thorir Hound of Birchisle, in Halogaland, made ready for a voyage to Biarmland, and, according to Snorri, launched for the purpose a great "longship-búza," which carried on board well-nigh 80 men. The reading here of the "Flatey-book" is "longship" simply, which I think is the sounder of the two. As in the case of Fairhair's dragon, I think we have in Snorri's text to deal with a case of anticipation. In the winter of 1061-2 King Harald Hardrada had built in the dock-yard at Niðarós a longship which

> was a *búzu*-ship. This ship was shaped after the size of the "Long Worm," wrought in every way in a most exquisite manner, there being a dragon-head afore and a crook astern, and all the bows were gold-adorned; it told up five-and-thirty benches, and was big in proportion and most fair withal.

The historian means to indicate by the term *buss*-(ship) that here there was built a longship of a new type for the first time in Norway. Ships of "buss" type were very common about the Mediterranean, not as ships of war, but of burden, and the name occurs in a great variety of forms: *busa*, *burcia*, *bussa*, *bucca*, *bucea*, *butz*, all, seemingly, indicative of capacity and breadth. King Harald, who served on board the Byzantine fleet for some years, must have become familiar with these ships, and have concluded that it would be advantageous to adapt the type to the longship-model of the North. The name doubtless came with him and his company, probably for the first time, to the North in 1044. After 1062 the buss-built ship became pretty common in the North.

Another foreign word for a ship—a war-ship—namely, "galeið," I am inclined to think came to the North at the same time; it occurs mostly as the name of the men-of-war of which the Byzantine fleet was composed, and "fara á galeiðr," to go on board the galleys, was equivalent to taking service in the Emperor's navy.[1] Generally the word is derived from γαλέα, Latin *galea;* but perhaps (τά) χελάνδια is the real original of the Norse form, they being *the* important warships of the fleet.

The vocabulary relating to objects connected with ships is very rich; but for want of space I cannot attempt here to give more than merely a limited selection of such terms. The keel, "kjölr," of large ships was laid down on slips, "bakkastokkar"; to the keel were joined stem-post, "fram-stafn," and stern-post, "skut-stafn," as well as the inside frame-work, the ribs, "inn-viðir," "rengr," "statumina." When the skeleton was finished, the case or shell was adjusted, consisting of as many strakes as the type of ship required; this was called "bera borði." The lowest strake was the "kjölsýja," the board "sewed" to the keel, the next strake above it was "aurboard," gravelboard (Engl. *gar-board, ground-strake, sand-strake*); the fifth strake was called "hrefni," of uncertain etymology, and the topmost strake was the "sólborð," lit. sunboard, answering to the "saxboard" in English boats. All Northern ships in saga times were clincher-built. A strake was a "saum-för," seampath; every strake-lap a "sýja," or "súð," suture (*cf.* súð above, page 15), or else "skör," from *skara*, to overlap. To secure water-tightness every strake-lap was caulked either with loose hair mixed with some viscous matter, perhaps most commonly tar, or with twisted thread of wool or hair steeped in similar substance, "*síð*-þráðr." This was done apparently at the same time that the strakes were riveted home with the "saumr," or, strictly speaking, "hnoð-saumr," nails, secured on the inside by means of "ró," washer or burr. The strength of the hull, "húfr," was secured by beams, "biti," "slá," and by knees, "kné," "krapti" or

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[1] Heimsk. iii. 77.

"kraptr" and "krappi" (in krappa-rúm) as well as by the gunwale, "borð," "borð-stokkr," "há-stokkr" (thole-stock), to the top of which were adjusted at proper distances the tholes "háir" (sing. hár) with the "hamla," oar-strap, drawn through a hole in them, attached. Between the tholes, withinboard, were the seats of the rowers, "há-setar" (thole-sitters), called "rúm," "sess," "sess-þilja," "þopta" (thwart) according to the various descriptions of the craft. When, as was the case with warships, the thwart did not go right across the ship, but was cut short at either board, leaving a piece of bench large enough to accommodate one rower, each "rúm" fell naturally into two half-rooms, "hálf-rými." When, sometimes, there is talk of several men being told off for each "hálf-rými," the statement evidently refers to an arrangement of relief-hands.

Propulsion, we know, was effected by oar, "ár," and sail, "segl"; the oar consisted of "blað," "árar-blað," blade, and the "hlumr," loom; when the boat was provided with tholes the oar moved in the oar-loop, but otherwise in the "hábora," oar-hole, which has been mentioned already (page 35); "ára-burðr" meant about the same as "stroke" in boat-racing language, and "ára-lag" mode, style of rowing; "árar-or ára-tog," pull; "ljósta árum í sjó" (smite oars into the sea) = to make a start; "halda upp árum," lay on, rest on the oars, etc., etc. The contrivances in connection with the sail were much more complicated and elaborate. There was first of all the mast, with which I have partly dealt above (page 20). Apparently the masts of the saga time were pole-masts only. The mast stood in a "stallr," step, or chock, in a block fitted to the keelson a little further to the fore than amidships, and was no doubt secured to a cross beam above to prevent it from slipping about. It is not clear what exactly took place when the mast was taken down in the larger ships. To steady it in its position a tackle was stretched from the top of it to the stem-post, called "stag," and stays, similarly fixed from either side, 'höfuðbenda," arrested it from swaying too much from side to side; the top was called "húnn,"a knop, and was sometimes gilt; below it was the "hún-bora," perforation, through which was drawn the "drag-reip," halyard, by means of which the sail-yard, "rá," was hoisted. This latter again was secured to the mast by means of a wooden parrel, "rakki," which must have been so contrived that it could be disengaged from the mast when need required, as otherwise yard and sail would cause an apparently insurmountable entanglement when the mast was raised and lowered.

The sail was a square-sail, apparently a good deal wider down below than at the yard, and, of course, much wider than the breadth of the ship. For the purpose of spreading it to full advantage to the wind use was made of the "beiti-áss," tacking boom, which we know from the Ynglinga Saga (ch. 51) reached so far beyond the gunwale that it could knock a man over-board from a boat sailing too close past. To either end of this boom, when called into use, were attached the clews, "kló, klær" of the sail. The ropes, called "ak-taumar" (from *aka*, to drive, as a sledge, and *taumr*, rein), braces, were lines which were attached to the ends of the "beiti-áss," or the clews of the sail, as the case might be, and were made fast in the stern quarter of the craft. By means of those lines the square sail was close-hauled, so as to catch a side-wind to the best advantage. The utmost close-hauling effected by these lines was called "at aka segli at endilöngu skipi," to haul the sail in parallel with the length line of the ship. It is a mistake to suppose that these braces were attached to the sail-yard, as is proved by this statement of the Laxdæla (ch. 18): "Thorarinn steered, and had the 'ak-taumar' across his shoulders, because the boat was blocked with goods; it was mostly laden with furniture, and so the cargo rose high." Thorarinn wanted to keep the "ak-taumar" above the bulk of the lading, so as not to knock over any article of it. But if he had made them fast in the ordinary way they would, coming from the nether limit of the sail, have had to pass right through the piled up lumber on board. If they had come from the sail-yard mast-high the reason given for Thorarin's management of them would have been absurd.

It seems probable that two "skaut-reip," sheets, that went with a sail were the same lines as the "ak-taumar," but were called "skaut-reip" on occasions when the use of the "beiti-áss" was dispensed with. The sail itself, "segl," "váð," was made of homespun until civilization brought in the cultivation of flax, or the knowledge of foreign-made sail-cloth. It was strengthened by a hem of rope called "lík," or "lík-sími," leeches, leech-lines, and was often striped in various colours, "stafat," "stafat vendi," sometimes embroidered, "sett skriptum," or decked with pall, "sett pellum." Of terms relating to the service at the sail we may mention: to hoist sail, "draga segl"; hoist top-high, "draga segl við hún"; set sail, "setja upp"; unfurl, "vinda segl"; to reef a sail, "hefla," a reef being "hefill"; to furl sail, "hlaða seglum"; strike sail, "láta ofan segl." Sailing by side-wind, tacking, "beita," required a special manipulation of the sail by means of the "ak-taumar."

The direction was regulated by means of the rudder, "styri," "stjórn," the lower, broader part of which was the "stjórnar-blað"; above came the stock or neck, "stýris-hnakki," held by the rudder-loop, "stýri-hamla," and terminating in the head "stýris-knappr"; into the neck was stuck the tiller, "hjálmvölr," "hjálmunvölr," stjórn-völr," "stjórnar-völr." The place for the rudder was the right-hand side buttock, or quarter of the vessel, whence that same side of the vessel was called "stjórn-borði," rudder side; within-board was the seat of the helmsman, "stjórnar-maðr," at whose back was the staying-board, "höfða-fjöl"; to steer was called "at sitja við stjórn," or simply "stýra." From the term "stjórn-borði" (Engl. *starboard*, French *estribord*, *stribord*, mod. *tribord*) came the phrase "á stjórn," short for "á stjórnborða," to starboard.

The opposite side of the ship was called "bak-borði," lar-board, but French *bâ-bord ;* the phrase "á bakborða "= Eng. "to port." I am inclined to think that *lar-* in "lar-board may be etymologically connected with Swed.-Dan. *lår-* in "låring," the buttock of a boat's stern.

Finally, a few words on the sections or divisions of which particularly the warships consisted. In Scandinavia sea-fights were the order of the day, and of decisive battles the record lies with actions at sea. On going into action, "búast till bardaga," the word of command to the crews was "to break up their weapons," "brjóta upp vapn sín." Every rower had his weapons in a chest under his seat, "sess-þilja," and those who were not rowers had theirs similarly kept in special lockers. The action began by the ships of the opposing fleets being lashed, "tengd," together, so the fighting resembled an engagement on land. The prow, "stafn," with its quarter deck, "rausn," forming the fore-castle, was, in every warship, the most important spot, from the tactical point of view. It was the part most exposed to attack, for, if boarding, "upp-ganga," was to be attempted with a chance of success, the prow-men, fore-castle dwellers, "stafn-búar," men of approved strength and valour, must first be cleared out of the way, lest the boarding party should be exposed to front and flank attack at one and the same time. Where the quarter deck ended began the main-deck, "þiljur" (þilja), a good deal lower in the ship than the former, and ran all the way aft to the poop. In shallow ships this deck was so low that the space under it could only be utilized for storage of ship's necessaries. Hence every warship carried an awning or tilt "tjald," which served for protection against cold, rain, and snow, and which could be speedily removed in case of need, "svipta tjöldum," "reka af sèr tjöld."

Aft there rose above the deck the poop, "lyfting," where the commander had his station, "staða," and sleeping accommodation, "hvíla"; it seems to have been open at the top, and provided with a poop-awning, "lyftingartjald." Here, it seems, was placed the commander's high-seat, "hásæti." Immediately in front of the poop was the section or division of the ship called fore-room, "fyrir-rúm," down to which the captain had to step on leaving the poop. Here was placed the high-seat chest, "hásætis-kista," the arsenal of the ship. As the weapons of the warriors on board gave out, or became useless, especially the swords, the stores of this chest were drawn upon for fresh supplies. In this "room" were stationed the men who stood highest in social rank, ready, in case of need, to form an emergency guard, "skjald-borg," around their chief. Next in front of this division was that called the "krappa-rúm," or main-hold, occupied by the "private" soldiers, a company mostly made up of the rowers. The name of this space can have nothing to do with "krappr," narrow, cramped; on the contrary, it was the widest portion of the ship, and derived its name from the many strong knees, "krappi" (accidentally not on record in old writers, but common all over Iceland), which here were adjusted to the ship's sides, this being the portion of the craft on which fell the force of the strain in heavy weather and rough sea.

The foremost "room" on the main deck was that which went under the name of "söx," and seems to have been between the line where the ship began to taper towards the stem and the afore-mentioned "rausn." The occupants were, perhaps, the "fram-byggjar," who are distinguished from the "stafn-búar," but seem to have been chosen for their station because they came nearest to the latter in high martial qualities. Besides the "rooms" here mentioned we hear of bailing-rooms, "austr-rúm," sometimes two on the same ship, one aft, the other fore, and Grettir's Saga (ch. 17) gives us a good insight into the water-tightness of the ships of old and the manner of bailing.

It goes without saying, that a people so devoted to ships and life on the water, would be rich in terms expressive of their experiences in water-travel; of these we must confine ourselves to only a few. Of course the cardinal points of the compass had their names long before load-stone or compass were known to these seafarers. But for the octant points, when speaking of the weather (veðr=wind) the Norwegian race had technical terms quite peculiarly their own, terms which the Icelanders took with them to their island and used as they had been used in the land of their forefathers, without troubling themselves with what logic had to say to the propriety of the use. Thus, because their forefathers in the old country said they sailed west, when they sailed from Norway to any point of land within the geographical complex now known as Great Britain and Ireland, the Icelandic descendants must needs use the same term when stating that they went from Iceland itself to any such point. "West I fared o'er sea" (*vestr fórk of ver*) says Egil, when he sails from Iceland having York in Northumberland for his ultimate goal.[1] Thorodd "Skattkaupandi" went on a trading voyage from Broadfirth in Iceland *west* to Ireland, to Dublin.[2] Illustrations of this kind are endless.

For an inhabitant of the western coast of Norway winds blowing from N.E. and S.E. blew over land, those from N.W. and S.W. up from the sea. They were therefore called respectively "landnyrðingr," "landsynningr," "útnyrðingr," "útsynningr." Not only are these winds invariably called by these names even when they happen to be blowing in mid-ocean, but they are called by these names still, all over Iceland, regardless of the fact that to the island no wind can come but across the sea. The sea was "sjór," "sær," but the ocean was "haf"=upheaval; that this was the idea which the term "haf" was originally meant to express, is obvious when we consider what must be the idea underlying the phrase: "sjór í miðjum hlíðum," sea mid-way up mountain, a nautical term indicative of a ship being at such a distance out in the offing that the intervening sea-upheaval hides from sight the lower half of the mountains of the land in view.

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[1] Egils Saga (F. Jónsson's ed.), 350.

[2] Eyrbyggja, p. 49.

How the old seafarers found their way there and back over vast oceans we know not fully. The sun by day, when seen, and stars, when showing, by night, undoubtedly were the principal guides. But how, after a period of fog or such thick weather as obscured the heavenly luminaries for days and nights together, they could ascertain their position, and keep on their course, and arrive where they intended, we know not. The loadstone, "leiðarsteinn," was unknown to Norsemen during the period of their greatest discoveries of lands over-sea; and yet we hear of very few cases that can be regarded as at all historical of these mariners losing their bearings. Whether the idea of the earth as a *ball*, "jarðarböllr,"[1] was present to the mind of the *early* Norse discoverers cannot be positively asserted, though the term haf=spherical convexity, as indicated above, would seem to favour that theory. The confidential converse held by the early Norse discoverers with nature, in order to find their way over the ocean, is tellingly illustrated by the following passage from Landnáma-bók, directing how to keep the ocean course from Norway to Greenland:—

> **From the Hern-isles in Norway people have to sail ever west to Hvarf [Cape Farewell] in Greenland; in such a case the course is to the north of Shetland so, that it be just descried when the out-look at sea is very clear; but to the south of the Faroes so, that sea be midway up mountain slopes; but so to the south of Iceland that they have thereof [the flight of] fowl and [the swim of] whale.**[2]

But I am out-running my space, and must now wind up.

The season of seafaring was the spring and summer. Before or about equinoxial autumn the Vikings, when not engaged too far away, returned home from their exploits and brought their ships to the roller, "ráða skipi til hlunns," and into their winter station, the boat-house, "naust" (=*nóa-uist*, *no-uist*, *no-u'st*, *naust*, *cf.* *forvista*—*forusta?* or, *naustibulum?*), which also means a ship-building yard. Their winter passed in idleness and drink. Spring again clothed "South-lands" and "West-lands" in sunny loveliness. The sun-awakened *furor Normannorum* finished the picture of the flowery season!

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[1] Rímbeygla, p. 440.

[2] "Af Hernum af Noregi skal sigla iamnann vestr til Hvarfs á Grænlandi : ok er þa siglt fyri nordann Hialltland sva at þui at eins se þat at allgod se siovar sýn : en fyri svnnan Færeyiar sva at sior er i midium hlidum : en sva fyri sunnan Island at þeir hafa af fvgl ok hval." Hauksbók, p. 4.

Finally, I desire to tender my cordial gratitude above all to Professor W. Ridgway for advice and suggestions most generously vouchsafed. My sincere thanks are also due to my kind chief, Mr. F. Jenkinson, Librarian, and to my colleague, Mr. J. Francis, for help ever ready in dealing with doubtful points in the English translation of the classical quotations. To Mr. E. J. Worman, M.A., is due the credit of the translation "buffeting" for "contumelia" (page 24).

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